

SOME SCIENTIFIC CENTRES.

X.—THE LIVERPOOL SCHOOL OF TROPICAL MEDICINE.

ON July 9, 1898, Major Ronald Ross completed the proof that the malaria of birds was transferred by the bite of mosquitoes from infected to healthy birds. In December, 1898, a commission was dispatched by the Colonial Office to British Central Africa to study blackwater fever, to inquire into the truth of Ross's discoveries, and to study the whole question further.

About this time, Sir Patrick Manson had been urging the formation of schools of tropical medicine, and the subject had received energetic support from Mr. Chamberlain. In Liverpool, also, the subject was warmly taken up, and with such practical result that the first tropical school was founded by Sir Alfred Jones, K.C.M.G., in November, 1898. Major Ross was appointed the first lecturer of the Liverpool School of Tropical Medicine, and the school was formally opened by Lord Lister on April 21, 1899, and on July 1 Major Ross delivered his inaugural lecture, directing attention to his scheme for extirpating malaria by attacking the pool-breeding mosquitoes. The further result of this was that at the end of July, 1899, the first (malarial) expedition of the school was dispatched to Sierra Leone, West Africa. This was the first of those expeditions to the tropics which have made the school famous. Since 1899 there has not been a year in which some expedition has not been carrying out research in the tropics, and at the present moment there are at work one in Brazil at yellow fever, another in Africa on trypanosomiasis; and a third is on the point of starting to study blackwater fever in Central Africa.

The educative effect of these expeditions has been immense, and we hardly think it can be doubted that every person interested, not only in West Africa, but in the tropics generally, owes a deep debt to the school. Not only has the direct practical outcome in the saving of life been great, but indirectly also a powerful effect is exercised on the young generation, so that now those going to the tropics do so with a knowledge of what risks they run in respect of malaria, and how to avoid them.

But, further, the influence of these expeditions and of the reports furnished by them has given an immense impetus to anti-mosquito measures all over the world. The most successful instance and the best known of these measures has been the extinction of malaria at Ismailia, and perhaps it is not too much to claim that the influence of the Liverpool School of Tropical Medicine has determined the magnificent success of anti-mosquito measures under Col. Gorgas against yellow fever at Havana.

In this connection it is of interest to point out that Major Ross will read a paper at Berlin this autumn summing up the progress of anti-malarial measures in British Possessions all over the world. The gain to the public is, then, we believe, a great one. That the scientific results have been not inconsiderable is evident from the publications of the well-known memoirs of the school. Since 1899, when the first memoir was published, twenty-one memoirs had been published up to 1906, together with a text-book, "The

Practical Study of Malaria and Other Blood Parasites."

Perhaps the two most striking discoveries recorded in these memoirs were, firstly, that of Dutton, of a human trypanosome in man, *T. gambiense*, the finding of which was the forerunner of that of the same trypanosome as the causative agent of sleeping sickness; and, secondly, Dutton and Todd discovered independently of Milne and Ross, the spirochæte, *S. duttoni*, of African tick fever, and they showed that it was transmitted by the tick *Ornithodoros moubata*.

Thus the school can claim a worthy, if not exclusive, share in the elucidation of three of the great diseases of Africa, viz. malaria, sleeping sickness (trypanosomiasis), and African tick fever. Thomas's successful experiment in Manaos in infecting chimpanzees with yellow fever by means of mosquitoes is also worthy of mention.

These expeditions have cost the school large sums of money, and have also involved the loss of two valuable lives, viz. those of Dr. Walter Myers and Dr. J. E. Dutton. Myers, who gave promise at Cambridge of a distinguished career, died of yellow fever at Para shortly after the commencement of his work. Dutton's



Prof. Ronald Ross, F.R.S.

brilliant career was cut short by death while working in the Congo. Two recent developments show that the school is still in vigorous youth, and is not content with its past achievements. We have above alluded to the publication of the memoirs. These memoirs were exclusively devoted to the publications of the results of the various expeditions of the school, and from this cause and from their somewhat expensive price it was thought advisable to change their form and to enlarge their scope. A journal of high standard devoted to tropical medicine and parasitology has long been needed, and it was resolved to admit publications from others than those who were connected with the school. The result has been to establish the "Annals of Tropical Medicine and Parasitology," which promises to have a successful and useful career before it.

The expeditions, as we have already stated, have become a marked feature of the school's activity. They have necessitated the establishment of special research laboratories. For although underlying these expeditions is the idea that research into tropical disease is best carried out in the area where the disease is

endemic, yet much material is accumulated during these expeditions which can only be worked out subsequently. As the laboratory accommodation is insufficient to accommodate all this material, a research department under a special director has been established at Runcorn, where ample room for animals and laboratory experiments exists. These laboratories also supply parasites in a living condition for the purposes of study in the teaching laboratories. Here numerous experiments have been and are being carried out in the treatment of sleeping sickness (trypanosomiasis). It was Thomas who first suggested atoxyl in the treatment of trypanosomiasis. This, followed by mercury, is probably the most hopeful treatment now in existence.

We may finally briefly refer to the laboratories, where the public, no less than by the expeditions, benefits by the training of medical men, already stationed in or about to proceed to the tropics. In fact, it is stated in its prospectus that the first of the objects of the school is to give a practical training to medical men proceeding to the tropics. In connection with this training, which is as thorough as the too-brief period of three months will allow, about thirty medical men pass through the school in the year, a number which is not too great for the staff successfully to cope with.

THE YEAR'S PHOTOGRAPHY.

THE annual exhibition of the Royal Photographic Society is now open at the New Gallery in Regent Street, and will remain open until September 26. Artistic, professional, and commercial photography are well represented, but we are concerned chiefly with the scientific and technical sections. The exhibition aims at showing the year's progress, and as the item that has aroused the most interest since last October is the commercial introduction of the Lumière "autochrome" plate, which serves for the copying of coloured objects in colour on a single plate, photographs by this method form the most conspicuous group in the exhibition. The results are transparencies on glass, and are conveniently arranged for viewing them in a darkened portion of the balcony. The character of the new plates has already been described in these columns, therefore it is sufficient to say here that they depend upon the usual principles of three-colour work, and that their novelty consists in having each plate complete in itself, and needing no instrument, taking or viewing screen, or other special accessory for their use or examination. Messrs. Lumière are to be congratulated on their success, and well deserve the medal that has been awarded them. As to the results, some appear to be excellent, while others must be faulty from the predominance of one of the three colours; but, as we have so often said before in connection with colour work, it is impossible to judge of the results as one would like to be able to unless the original is side by side with the copy. No exhibitor seems to have cared to submit any of his pictures to this test. This remark also applies to the other colour photographs, which demonstrate that the multiple-plate methods still hold their own, and that the standard of perfection has, perhaps, a tendency to rise. Photomicrographs of the grain of the "autochrome" plates and spectra taken on them are on view, and serve to show the limitations of three-colour processes when dealing with the comparatively unmixed colours of the spectrum.

Some of the photographs of Mars, taken two months ago at the Lowell Observatory, are shown by Profs. Lowell and Lampland. Several canals are visible, and one has been photographed double.

Drawings of the planet made under high magnification are added for the sake of comparison. The Greenwich Observatory send four frames of work done during the year, which include the recent comet, Saturn and its satellite Phœbe, and Jupiter and its satellites VI. and VII. These astronomical exhibits will prove of great interest, not only to those who are students of the subject, but also to those whose chief source of information is their daily paper.

Of the considerable collection of photographs of living creatures it is possible to refer to only a few. Mr. Douglas English contributes a series of photographs illustrating the life and history of the British mud-wasp, but his most striking exhibits are those in which he has obtained a very close imitation of the colour of the original by locally modifying the image with reagents, and in one case backing it with "metallic powders." He is bold enough to send the actual skin in one case to show how very nearly he has reproduced the colour. Notwithstanding Mr. English's success, we are inclined to discourage work of this kind, because by such manipulation the examples lose much of their value as photographs, and it is very doubtful as to how long the colours produced in this way will remain without change; but it must be admitted that at present they convey an excellent idea of the originals. Among the other exhibits of special interest may perhaps be mentioned Mrs. Veley's "Lemur Studies," Mr. W. Bickerton's three photographs of the common tern alighting at its nest after flight, and Mr. Alfred Taylor's ten photographs of the "Long-eared Owl from the Egg to Maturity." Mr. Daniel Finlayson's three frames are of a kind that must be exceedingly useful for teaching purposes. He shows the leaves of four common plants "awake and asleep," five photographs illustrating "Red Clover strangled by Dodder," and ten distinct examples of "Seed Dispersal by Hooks, Parachutes, and Wings."

Pathological work is not much in evidence, but the majority of visitors will doubtless find a personal interest in Dr. G. H. Rodman's radiograph of the two hands of a young lady, one of which was severely affected by rheumatism. The small bones of the diseased wrist are apparently matted together. Mr. Martin Duncan's photomicrographs of living bacteria are noteworthy, though for practical purposes of identification microscopists will probably continue to prefer to deal with dead "preparations." Mr. Duncan gives no hint of his method which he "has now perfected."

There are numerous other exhibits of many various subjects, for the collection of this year surpasses that of any previous year that we recollect in interest, variety, and general technical excellence; but we must refer to Mr. Frederick E. Ives's diffraction gratings, though they are not strictly photographic. These replicas are made with fish-glue instead of gelatin, and, by the means described in the catalogue, he has obtained, in addition to normal results, "freak gratings" of many different kinds. Not only can most of the light be thrown into the first-order spectrum on one side, but vigorous copies can be made from weak originals. A considerable variation of colour effects is shown in the "freaks," and may serve to indicate some of the possibilities of variations that may occur to a greater or less extent in gratings intended to give normal results. These gratings can be seen on application to the attendant by anyone interested in the subject.

Those who wish to see the results of the practical application of photographic methods to pictorial purposes will find a collection of excellent examples in the west room which is devoted to this section, and a